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AOA QUEENSLAND BRANCH ASM 2014

OSSEOINTEGRATION FOR LIMB LOSS: CAN AUSTRALIA PLAY A KEY ROLE?

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(2) Queensland University of Technology, Brisbane, Australia
(3) Wesley Hospital, Brisbane, Australia

Frossard L, Schuetz M, Sommerville S. Osseointegration for limb loss: can Australia play a key role?. Australian Orthopeadic Association (AOA) Queensland Branch. 2014. Gold Coast, Australia.

Introduction & aims

Individuals with limb amputation fitted with conventional socket-suspended prostheses often experience socket related discomfort leading to a significant decrease in quality of life. Most of these concerns can be overcome by surgical techniques enabling bone-anchored prostheses. In this case, the prosthesis is attached directly to the residual skeleton through a percutaneous implant.[1-6] The aim of this study is to present the current advances in these surgical techniques worldwide with a strong focus on the developments in Australia and Queensland.

Methods

The current advances will be extracted from a systematic literature review including approximately 40 articles. The outcomes measured will include the estimation of the population worldwide as well as the complications (e.g., infection, loosening, fractures, and breakage) and the benefits (e.g., functional outcomes, health-related quality of life)[1, 5, 7-28].

Results

The population of individuals fitted with a bone-anchored prosthesis is approximately 500 worldwide. Publications focusing on infection are sparse. However, the rate of superficial infection is estimated at 20%. Deep infection occurs rarely. Loosening and peri-prosthetic fractures are fairly uncommon. Breakage of implant parts occurs regularly mainly due to fall. All studies reported a significant improvement in functional level and overall quality of life.

Conclusions

Several commercial implants are in developments in Europe and US. The number of procedures is consistently growing worldwide. This technique might be primary way to fit a prosthesis to young and active amputees by 2025. Interestingly, Australia is one of the very few countries offering patients choices between the two most advanced implants either in Melbourne or in Sydney.

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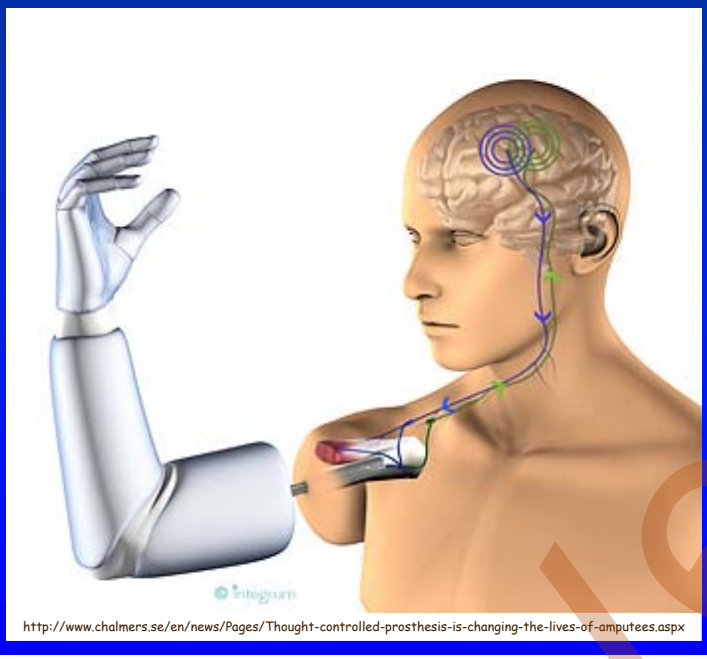
Osseointegration for limb loss: can Australia play a key role?



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Gold Coast, Australia - 31/05/2014

Disclosure

Conflict

Declaration of Interest

I declare that in the past three years I have:

- held shares in: NIL
- received royalties from: NIL
- done consulting work for:
  - Munjed Al Muderis – Orthopaedic Surgery
  - University of the Sunshine Coast
- given paid presentations for: NIL
- received institutional support from: NIL

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Osseointegration for limb loss: can Australia play a key role?

ePrint Version

Introduction

Purpose

Overview of benefits and safety of orthopedic osseointegration for bone-anchored prostheses

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Context

Socket

Socket

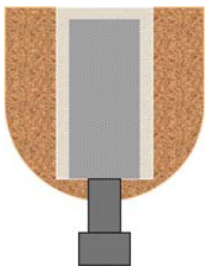
Attachment

ePrint Version

Context

Socket

Fixation



Socket

Fixation

Attachment

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Commercial fixations

ITAP

ILP

Integral Leg Prosthesis
Orthodynamics Pty Ltd
UK

Dr Horst Aschoff

Lunow, C., K. Staubach, and H. Aschoff, [Endo-exo Femoral Prosthesis]. Zeitschrift Der Unfallchirug, 2010. In press

Dr. Ing. Hans Grundei

http://www.endo-exo.de/english/patienten-index.php

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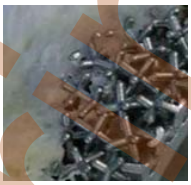
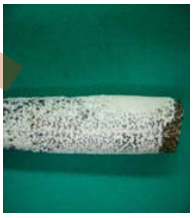
ITAP

ILP

Interface fixation - bone





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http://www.osseointegrationaustralia.com.au/background-of-osseointegration/history-of-osseointegration

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Commercial fixations

ITAP

ILP

OPL

Osseointegrated Prosthesis Limb
Med-Italia Biomedica SRL, Italy
Sydney, Australia

Designed and used in Australia

Dr Munjed Al Muderis

ePrint Version

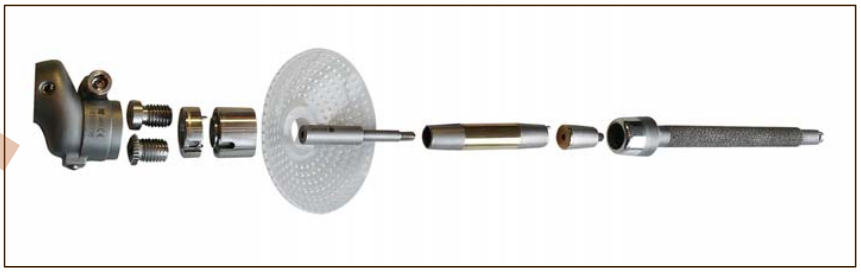
Commercial fixations

ITAP

ILP

OPL

Schematic: from ILP to OPL



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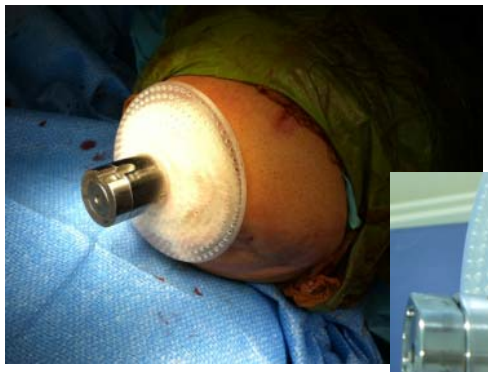
- ILP
- OPL

Residuum post-op



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Commercial fixations

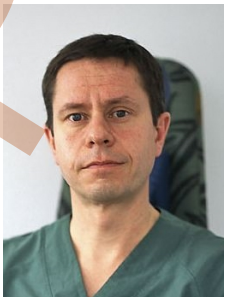
- ITAP
- ILP
- OPRA

Osseointegrated Prosthesis for Rehabilitation of Amputees

Integrum AB

Sweden

Dr Rickard Branemark



Dr Kerstin Hagberg

Eva Haggstrom

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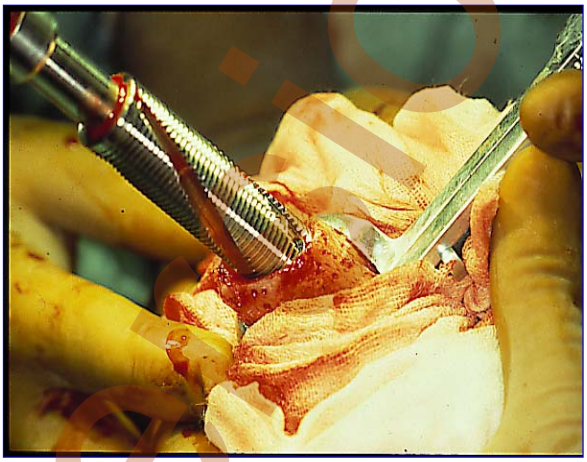
ITAP

ILP

OPRA

Interface fixation - bone



http://www.abc.net.au/science/slab/leg/default.htm

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ITAP

ILP

OPRA

X-rays

Nebergall, A., C. Bragdon, A. Antonellis, J. Kärrholm, R. Brånemark, and H. Malchau, Stable fixation of an osseointegated implant system for above-the-knee amputees. Acta Orthopaedica, 2012. 83(2): p. 121-128

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ITAP

ILP

OPRA

Residuum post-op

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Commercial fixations

ITAP

ILP

OPRA

Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw

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Commercial fixations

ITAP
ILP
OPRA
Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2	2

Stage 1
Stage 2

eFirst Version

Commercial fixations

ITAP
ILP
OPRA
Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2 -> 1	2

Randomised clinical trial: Efficacy and safety of one-stage procedure

Stage 1
Stage 2

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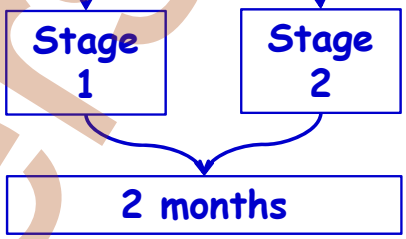
ITAP
ILP
OPRA
Overview

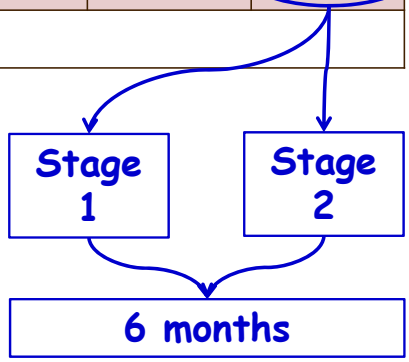
	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2	2
Duration rehabilitation *	4 mth	4 mth	12 mth
* Estimation			



Commercial fixations

ITAP
ILP
OPRA
Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2	2
Duration rehabilitation *	4 mth	4 mth	12 mth
* Estimation			



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Commercial fixations

ITAP
ILP
OPRA
Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2	2
Duration rehabilitation *	4 mth	4 mth	12 mth
Nb of years of experience *	8	2	15
* Estimation			

ePrint Version

Commercial fixations

ITAP
ILP
OPRA
Overview

	ILP	OPL	OPRA
Interface fixation - bone	Press-fit	Press-fit	Screw
Nb of surgery	2	2	2
Duration rehabilitation *	4 mth	4 mth	12 mth
Nb of years of experience *	8	2	15
Nb of patients *	100	80	500
	180		
* Estimation			

Most published and acknowledged

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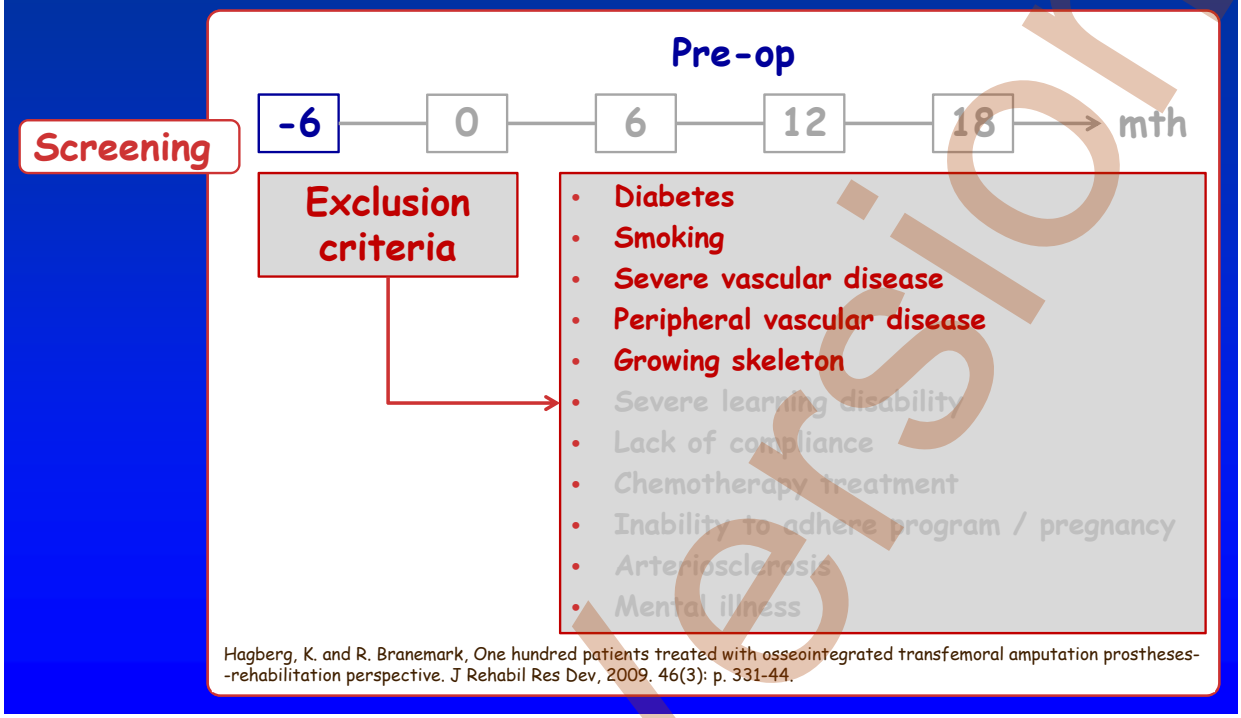
Treatment with OPRA



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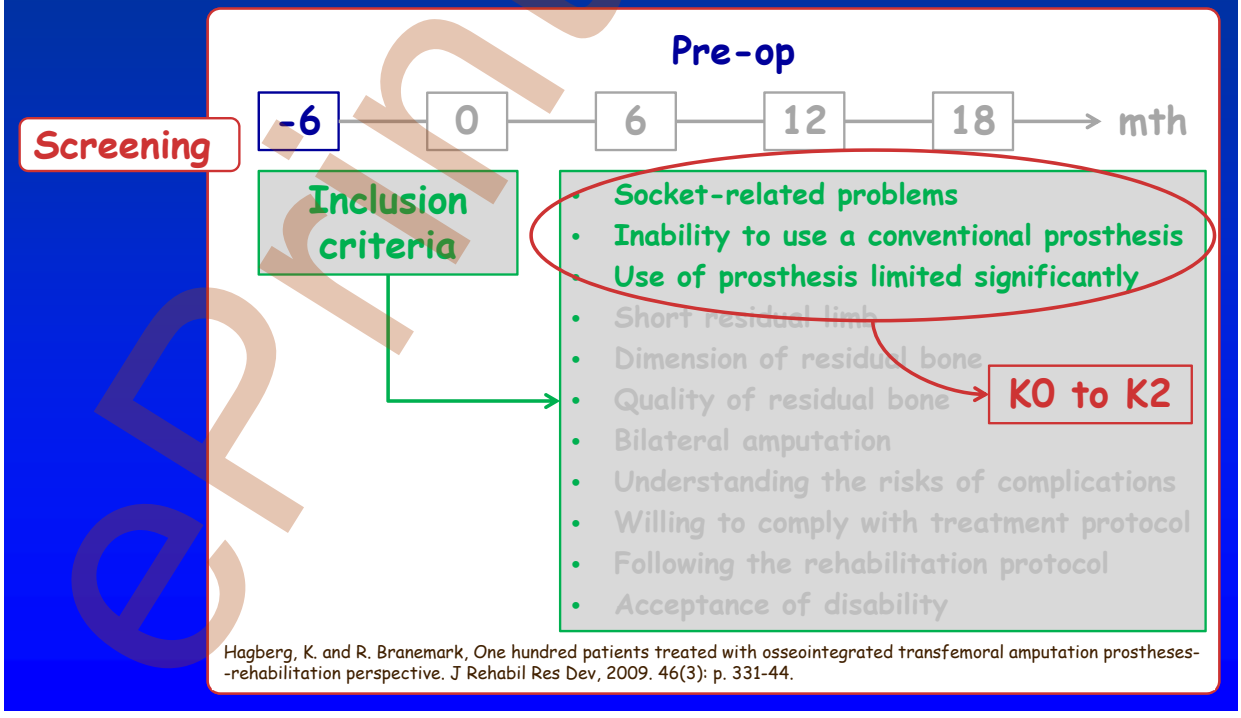
Treatment with OPRA



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Treatment with OPRA

Residuum pre-op

Screening

-6 — 0 — 6 — 12 — 18 → mth

Surgery

Skin

Femur

Treatment with OPRA

Stage 1 - Insertion medullar part

Screening

-6 — 0 — 6 — 12 — 18 → mth

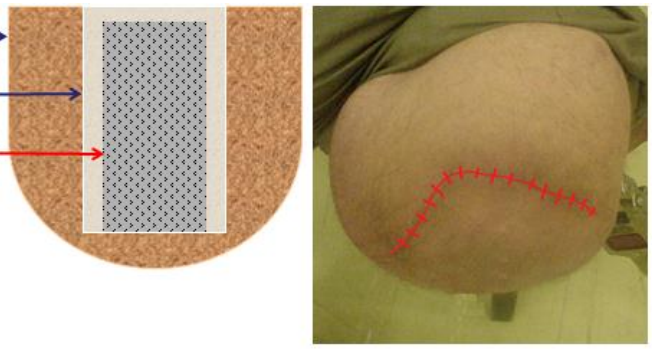
Surgery

Skin

Femur

Implant

Fixation



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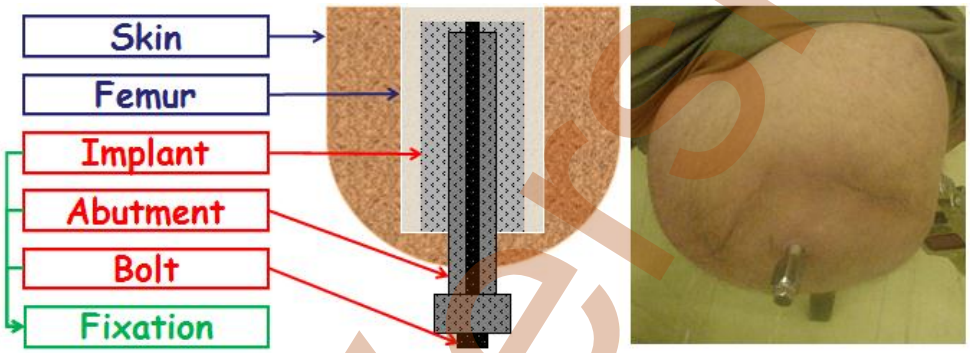
Treatment with OPRA

Screening

Surgery

Stage 2 – Insertion percutaneous parts

-6 — 0 — 6 — 12 — 18 → mth



Treatment with OPRA

Screening

Surgery

Rehab

Principle

-6 — 0 — 6 — 12 — 18 → mth

Bone remodelling
=
Right load
+
Right time

Vertriest S, Coorevits P, Bråmark R, Hagberg K, Bråmark R, Vanderstraeten G, Frossard L. Static load bearing exercises of individuals with transfemoral amputation fitted with an osseointegrated implant: Reliability of kinetic data. IEEE Transactions on Neural Systems and Rehabilitation Engineering. 2014. Accepted minor revisions.

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Treatment with OPRA

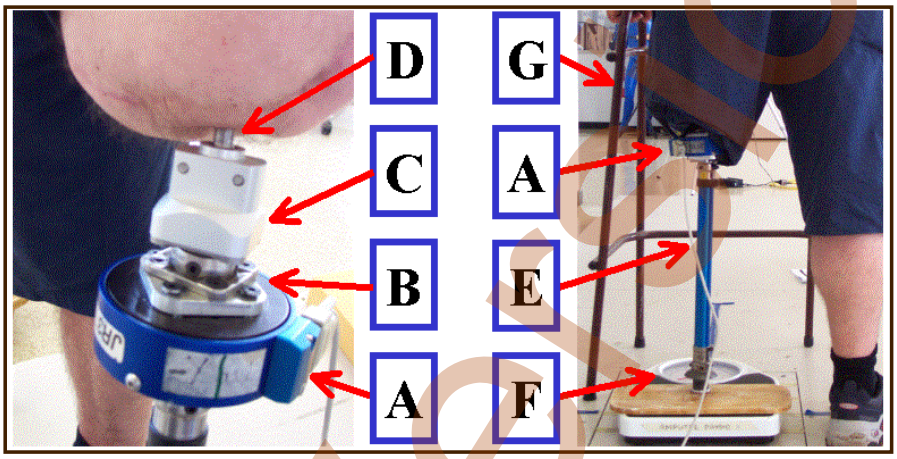
Screening

Surgery

Rehab

Static load bearing exercises

-6 — 0 — 6 — 12 — 18 → mth



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Treatment with OPRA

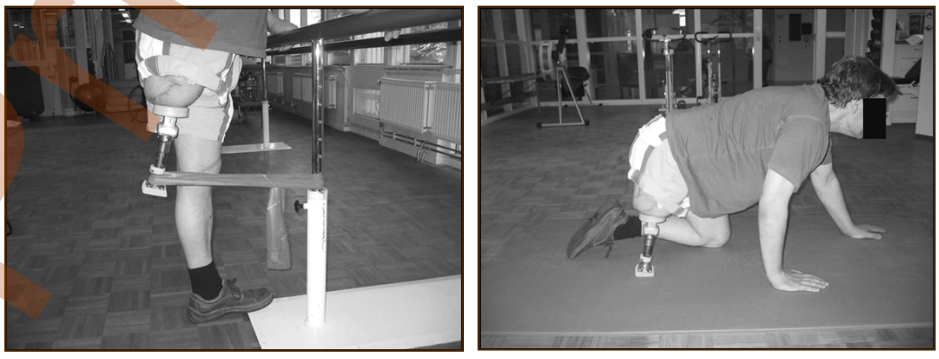
Screening

Surgery

Rehab

Dynamic load bearing exercises

-6 — 0 — 6 — 12 — 18 → mth



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Treatment with OPRA

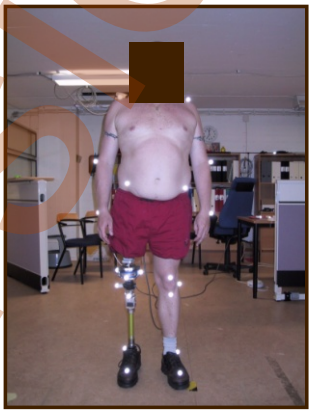
Screening

Surgery

Rehab

Walking aids

-6 — 0 — 6 — 12 — 18 → mth



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Treatment with OPRA

Screening

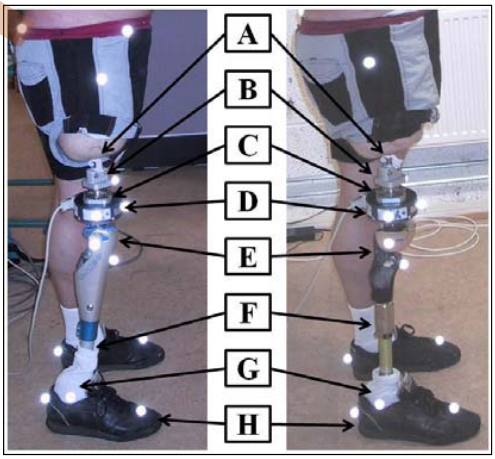
Surgery

Rehab

Fitting

Choice of components

-6 — 0 — 6 — 12 — 18 → mth



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Benefits

Health-related quality of life: SF 36

Benefits

Table III. Questionnaire for Persons with a Transfemoral Amputation (Q-TFA) and Short-Form (SF)-36 scores at baseline and change from baseline to 12- and to 24-month follow-up, respectively. Three patients failed to complete the whole questionnaire at each visit

	Mean score (range) [median; SD] (no. patients)		
Variable	**Baseline**	**Change from baseline to 12 mths**	**Change from baseline to 24 mths**
SF-36			
Physical function	35 (0 to 85) [30; 22] (n = 51)	22 (-40 to 70) [20; 24] (n = 47)§	23 (-23 to 75) [25; 21] (n = 45)§
Role-physical	41 (0 to 100) [25; 42] (n = 50)	24 (-50 to 100) [25; 44] (n = 45)§	22 (-50 to 100) [13; 36] (n = 44)§
Bodily pain	55 (10 to 100) [51; 26] (n = 51)	7 (-62 to 74) [0; 26] (n = 47)	6 (-61 to 69) [9; 30] (n = 45)
General health	78 (37 to 100) [82; 18] (n = 51)	3 (-32 to 40) [0; 17] (n = 47)	-1 (-42 to 40) [0; 18] (n = 45)
Vitality	60 (15 to 90) [60; 20] (n = 51)	5 (-50 to 45) [5; 19] (n = 47)	3 (-70 to 45) [5; 23] (n = 45)
Social function	78 (13 to 100) [88; 25] (n = 51)	2 (-50 to 50) [0; 24] (n = 47)	1 (-100 to 63) [0; 30] (n = 45)
Role-emotional	75 (0 to 100) [100; 39] (n = 50)	5 (0 to 100) [0; 43] (n = 46)	0 (0 to 100) [0; 45] (n = 44)
Mental health	74 (4 to 100) [80; 21] (n = 51)	2 (-44 to 40) [0; 18] (n = 47)	2 (-76 to 40) [4; 24] (n = 45)
SF-36 Physical Component Summary‡	74 (4 to 100) [80; 21] (n = 50)	2 (-44 to 40) [0; 18] (n = 45)§	2 (-76 to 40) [4; 24] (n = 44)§
SF-36 Mental Component Summary‡	53 (19 to 69) [57; 13] (n = 50)	-2 (-33 to 23) [-2; 11] (n = 45)	-3 (-44 to 22) [0; 15] (n = 44)

* a Prosthetic Use Score of 0 means the patient is not using a prosthesis and consequently the Prosthetic Mobility Score, Problem Score and Global Score could not be answered, hence results for lower numbers of patients in those scores[1]
† the Problem Score is reversed, which means a lower figure indicates fewer problems related to amputation and prosthesis
‡ SF-36 Physical and Mental Component Summaries are normalised to the general population (mean 50 (SD 10))[13]
§ $p < 0.001$

Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

Benefits

Health-related quality of life: SF 36

Benefits

Table III. Questionnaire for Persons with a Transfemoral Amputation (Q-TFA) and Short-Form (SF)-36 scores at baseline and change from baseline to 12- and to 24-month follow-up, respectively. Three patients failed to complete the whole questionnaire at each visit

	Mean score (range) [median; SD] (no. patients)		
Variable	**Baseline**	**Change from baseline to 12 mths**	**Change from baseline to 24 mths**
SF-36			
Physical function			
Role-physical			
Bodily pain			
General health			
Vitality			
Social function			
Role-emotional			
Mental health			
SF-36 Physical Component Summary‡			
SF-36 Mental Component Summary‡			

* a Prosthetic Use Score of 0 means the patient is not using a prosthesis and consequently the Prosthetic Mobility Score, Problem Score and Global Score could not be answered, hence results for lower numbers of patients in those scores[1]
† the Problem Score is reversed, which means a lower figure indicates fewer problems related to amputation and prosthesis
‡ SF-36 Physical and Mental Component Summaries are normalised to the general population (mean 50 (SD 10))[13]
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Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

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Benefits

Health-related quality of life: Q-TFA

Benefits

Table III. Questionnaire for Persons with a Transfemoral Amputation (Q-TFA) and Short-Form (SF)-36 scores at baseline and change from baseline to 12- and to 24-month follow-up, respectively. Three patients failed to complete the whole questionnaire at each visit

	Mean score (range) [median; SD] (no. patients)		
Variable	**Baseline**	**Change from baseline to 12 mths**	**Change from baseline to 24 mths**
Q-TFA*			
Prosthetic use score	47 (0 to 100) [52; 37] (n = 51)	34 (-23 to 100) [29; 29] (n = 44)§	32 (-100 to 100) [29; 41] (n = 45)§
Prosthetic mobility score	52 (0 to 82) [56; 20] (n = 42)	14 (-29 to 46) [16; 17] (n = 36)§	18 (-29 to 48) [17; 16] (n = 37)§
Problem score†	44 (5 to 77) [48; 19] (n = 42)	-28 (-57 to 2) [-33; 16] (n = 36)§	-27 (-59 to 7) [-30; 16] (n = 37)§
Global score	38 (0 to 92) [33; 19] (n = 42)	37 (-17 to 84) [34; 26] (n = 36)§	39 (0 to 92) [34; 24] (n = 37)§
Overall situation (n, %)			
Extremely poor	5 (*10*)	n = 42	n = 45
Poor	15 (*29*)	Declined: 2 (*5*)	Declined: 3 (*7*)
Average	17 (*33*)	No change: 11 (*26*)	No change: 11 (*24*)
Good	9 (*18*)	Improved: 29 (*69*)§	Improved: 31 (*69*)§
Extremely good	5 (*10*)		

Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

Benefits

Health-related quality of life: Q-TFA

Benefits

Table III. Questionnaire for Persons with a Transfemoral Amputation (Q-TFA) and Short-Form (SF)-36 scores at baseline and change from baseline to 12- and to 24-month follow-up, respectively. Three patients failed to complete the whole questionnaire at each visit

	Mean score (range) [median; SD] (no. patients)		
Variable	**Baseline**	**Change from baseline to 12 mths**	**Change from baseline to 24 mths**
Q-TFA*			
Prosthetic use score			
Prosthetic mobility score			
Problem score†			
Global score			
Overall situation (n, %)			
Extremely poor			
Poor			
Average			
Good			
Extremely good			

Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

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Benefits

Benefits

Sitting

http://osseointeg.ning.com/profile/ErikAx

http://www.sahlgrenska.se/su/osseointegration

ePrint Version

Benefits

Benefits

Body representation

N=13

" The prosthesis (OI-prosthesis) is a part of me since it works so well, and you don't have to think that it's a problem and that it should be hard and so forth . . . it's more like a substitute, my ¨ pretend leg¨ "

http://news.bme.com/tag/amputation/

Lundberg, M., K. Hagberg, and J. Bullington, My prosthesis as a part of me: a qualitative analysis of living with an osseointegrated prosthetic limb. Prosthetics and Orthotics International, 2011. 35(2): p. 207-214

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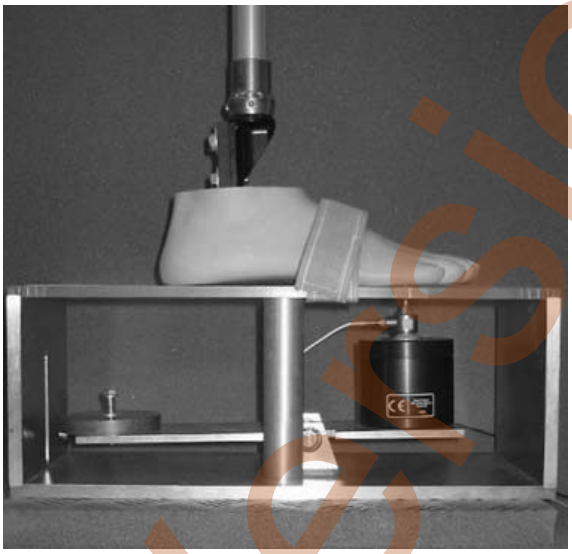
Benefits

Benefits

Osseoperception



Hagberg, K., E. Häggström, S. Jönsson, B. Rydevik, and R. Brånemark, Osseoperception and Osseointegrated Prosthetic Limbs, P. Gallagher, D. Desmond, and M. MacLachlan, Editors. 2008, Springer London. p. 131-140

Benefits

Benefits

Doning and doffing

Hagberg, K., E. Häggström, S. Jönsson, B. Rydevik, and R. Brånemark, Osseoperception and Osseointegrated Prosthetic Limbs, P. Gallagher, D. Desmond, and M. MacLachlan, Editors. 2008, Springer London. p. 131-140

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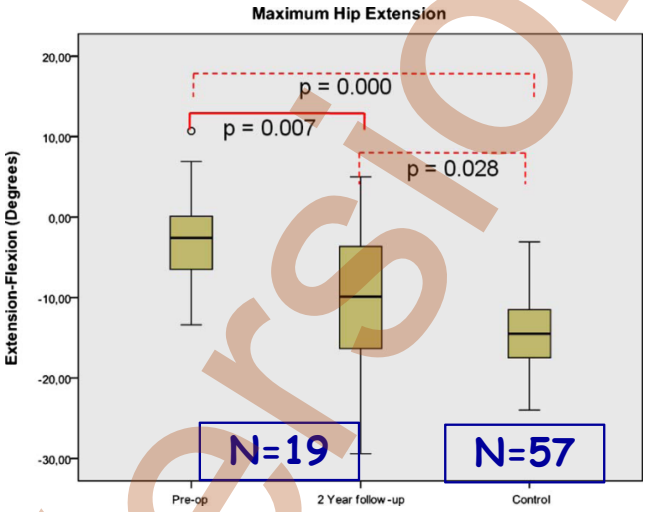
Benefits

Benefits

Hip range of movement

http://osseointeg.ning.com/profile/ErikAx



Tranberg, R., R. Zügner, and J. Kärrholm, Improvements in hip- and pelvic motion for patients with osseointegrated trans-femoral prostheses. Gait & Posture, 2011. 33(2): p. 165-168

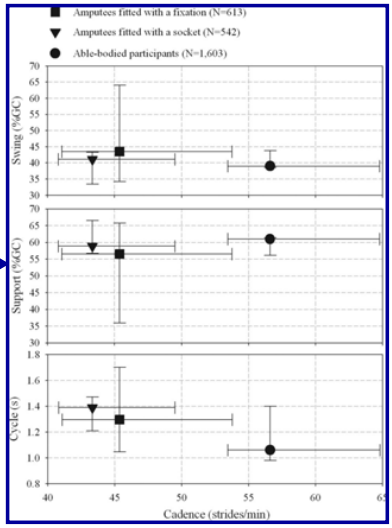
ePrint Version

Benefits

Benefits

Functional outcomes

N=12



Frossard, L., K. Hagberg, E. Haggstrom, D. Lee Gow, R. Branemark, and M. Pearcy, Functional outcome of transfemoral amputees fitted with an osseointegrated fixation: Temporal gait characteristics. Journal of Prosthetics and Orthotics, 2010. 22(1): p. 11-20

Created by Laurent Frossard (PhD)

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Risks

Risks

Infections

Overview - Deep infections

	Inclusion		Follow-up (2-3 yrs)	
Reference	[1]	[2]	[1]	[2]
Number of participants in study	39	51	39	51
Definite implant infection / Deep implant infection	5%	11%	15%	0%

[1] Tillander, J., K. Hagberg, L. Hagberg, and R. Branemark, Osseointegrated Titanium Implants for Limb Prostheses Attachments: Infectious Complications. Clinical Orthopaedic Related Research, 2010. 468(10): p. 2781-2788

[2] Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

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Risks

Infections

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Reference	[1]	[2]	[1]	[2]
Number of participants in study	39	51	39	51
Definite implant infection / Deep implant infection	5%	11%	15%	0%

Short course of antibiotics

[1] Tillander, J., K. Hagberg, L. Hagberg, and R. Branemark, Osseointegrated Titanium Implants for Limb Prostheses Attachments: Infectious Complications. Clinical Orthopaedic Related Research, 2010. 468(10): p. 2781-2788

[2] Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

Risks

Infections

Overview – Superficial infections

	Inclusion		Follow-up (2-3 yrs)	
Reference	[1]	[2]	[1]	[2]
Number of participants in study	39	51	39	51
Local soft tissue infection in the skin penetration area / Superficial infection	17%	11%	29%	69%

[1] Tillander, J., K. Hagberg, L. Hagberg, and R. Branemark, Osseointegrated Titanium Implants for Limb Prostheses Attachments: Infectious Complications. Clinical Orthopaedic Related Research, 2010. 468(10): p. 2781-2788

[2] Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

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Risks

Infections

Overview – Superficial infections

	Inclusion		Follow-up (2-3 yrs)	
Reference	[1]	[2]	[1]	[2]
Number of participants in study	39	51	39	51
Local soft tissue infection in the skin penetration area / Superficial infection	17%	11%	29%	69%

→ **Cleaning**

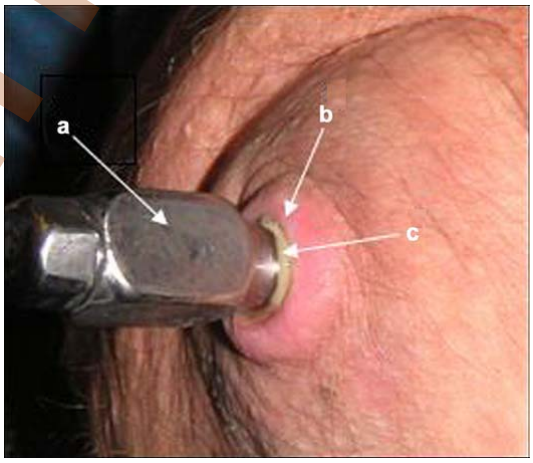
[1] Tillander, J., K. Hagberg, L. Hagberg, and R. Branemark, Osseointegrated Titanium Implants for Limb Prostheses Attachments: Infectious Complications. Clinical Orthopaedic Related Research, 2010. 468(10): p. 2781-2788

[2] Branemark, R., O. Berlin, K. Hagberg, P. Bergh, B. Gunterberg, and B. Rydevik, A novel osseointegrated percutaneous prosthetic system for the treatment of patients with transfemoral amputation: A prospective study of 51 patients. Bone Joint J, 2014. 96(1): p. 106-113.

Risks

Infections

Discharge



Pitkin, M., On the way to total integration of prosthetic pylon with residuum. Journal of Rehabilitation Research & Development, 2009. 46(3): p. 345-360

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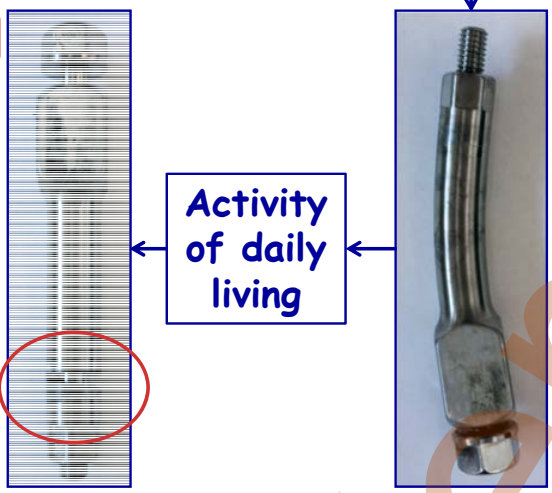
Risks

Infection

Fractures

High-impact activities / Falls



Activity of daily living

Thompson M. Mechanical analysis of osseointegrated transfemoral implant systems. 2009. Master Thesis. Queen's University Kingston, Ontario, Canada

Risks

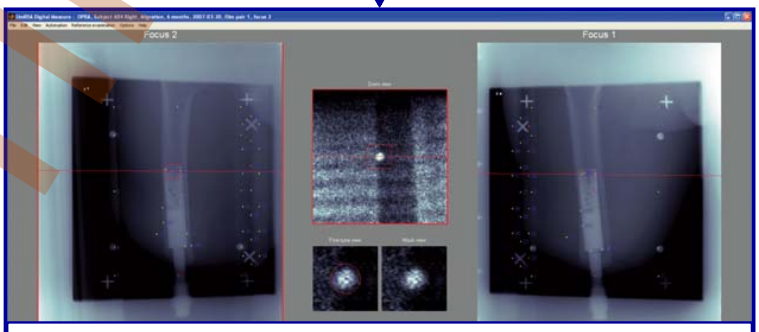
Infection

Fractures

Loosening

Titel RSA and radiographic

N=55



1, 2, 5, 7, 10 years post-op

Strong bonding

Nebergall, A., C. Bragdon, A. Antonellis, J. Kärrholm, R. Brånemark, and H. Malchau, Stable fixation of an osseointegated implant system for above-the-knee amputees. Acta Orthopaedica, 2012. 83(2): p. 121-128

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Future developments

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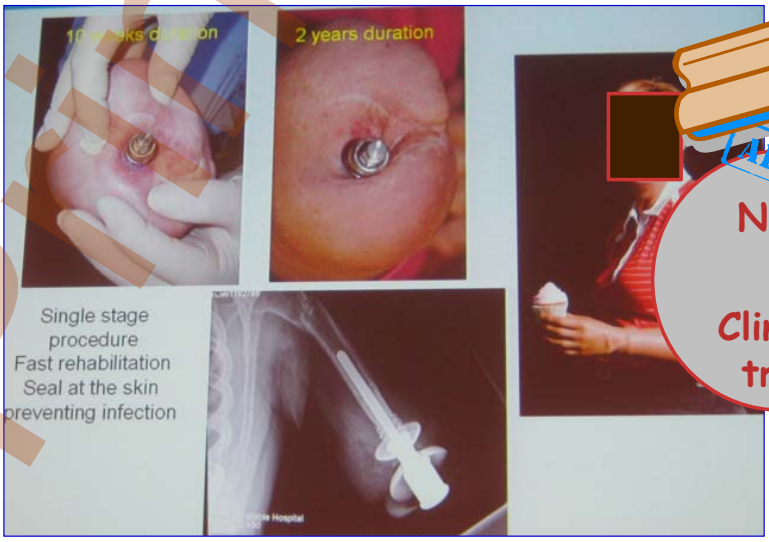
Future developments

Fixation

ITAP, Stanmore Implant, UK



Kang, N.V., C. Pendegrass, L. Marks, and G. Blunn, Osseocutaneous integration of an intraosseous transcutaneous amputation prosthesis implant used for reconstruction of a transhumeral amputee: Case report. The Journal of Hand Surgery, 2010. 35(7): p. 1130-1134.

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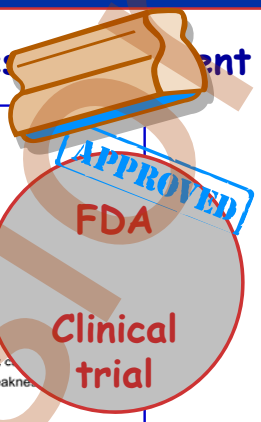
Future developments

Fixation

University of Utah - Orthopaedic ent



Orthotics/Prosthetics

Researcher announces plans for FDA study of osseointegrated implants

September 24, 2013

ORLANDO, Fla. — A Food and Drug Administration early feasibility study is expected to begin next year to t implants on humans, according to the presenter of the Keynote Address here at the O&P World Congress.

Roy Bloebaum, PhD, research professor at the University of Utah School of Medicine and co-director of the D Veterans Affairs Bone and Joint Research Lab in Salt Lake City, said a percutaneous, osseointegrated implant c socket complications, such as pain, discomfort, skin breakdown, pressure sores, phantom pain and muscle weakne improve mobility, comfort and the ability to quickly don and doff a prostheses.

Bloebaum and his colleagues have successfully implanted osseointegrated devices in sheep models, and they except to begin implanting the devices on human participants in April 2014.

"We want to inhibit periprosthetic infections, and we want to get successful load bearing," he said.

The study, collaboration between the University of Utah, Walter Reed National Military Medical Center and Brooke Army Medical Center, will include 10 transfemoral amputee participants. The evaluation process will include psychological and social prescreening tests and pre-implant and post-implant assessments, as well as a two-stage implementation procedure. Patients will then undergo follow-up testing for a minimum of 12 months, and two independent review boards will monitor the study.

Roy Blobaum

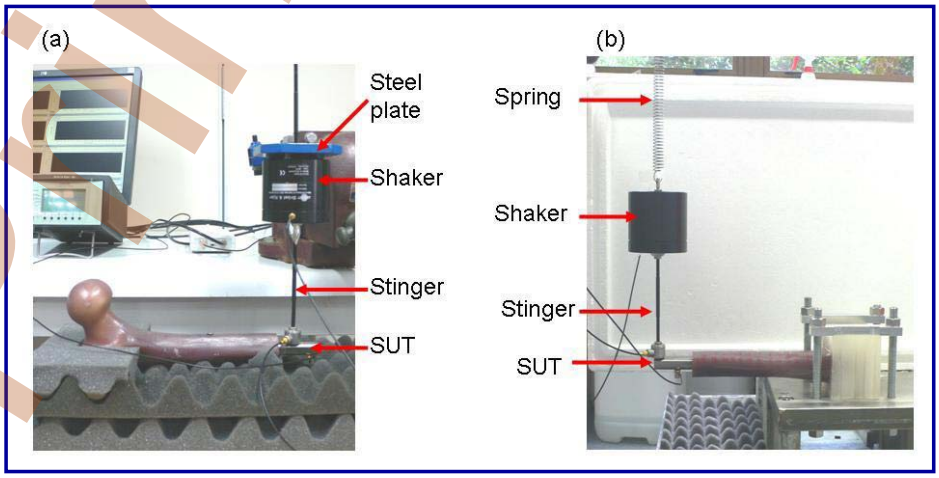
http://www.healio.com/orthotics-prosthetics/prosthetics/news/online/%7Bbf5a0e16-eb8c-4e89-aa8b-0e2941bc31fb%7D/researcher-announces-plans-for-fda-study-of-osseointegrated-implants

Future developments

Fixation

Focus

Vibration and osseointegration



Cairns N. The Feasibility of Vibration Analysis as a Technique to Detect Osseointegration of Transfemoral Implants. PhD. QUT

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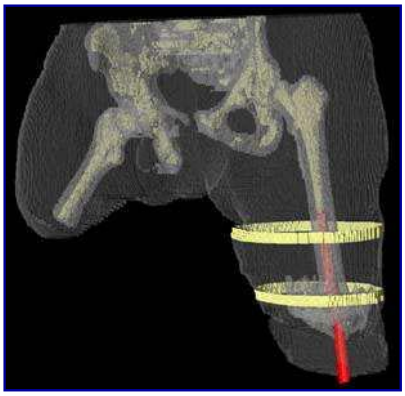
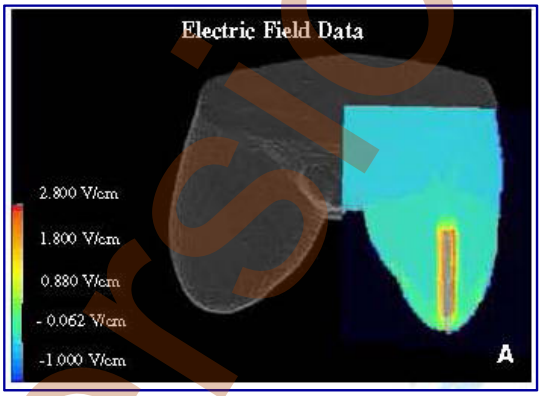
Future developments

Fixation

Focus

Electrical field for osseointegration





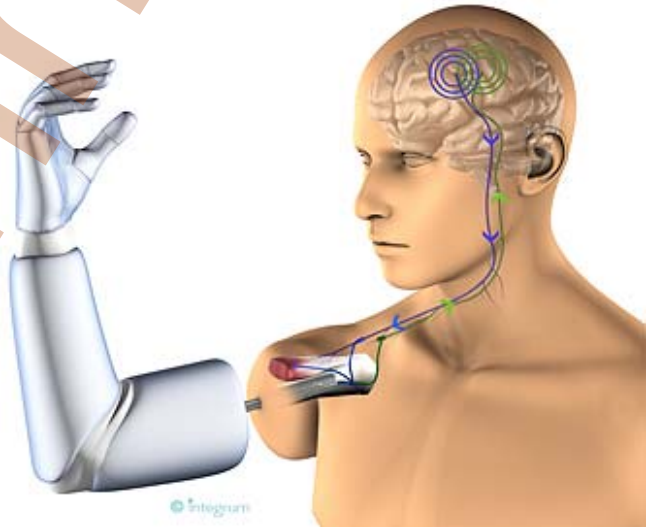
Isaacson, B.M., J.G. Stinstra, R.D. Bloebaum, P.F. Pasquina, and R.S. MacLeod, Establishing multiscale models for simulating whole limb estimates of electric fields for osseointegrated implants. IEEE Trans Biomed Eng, 2011. 58(10): p. 2991-4.

Future developments

Fixation

Focus

Neuromuscular control of prosthesis



http://www.chalmers.se/en/news/Pages/Thought-controlled-prosthesis-is-changing-the-lives-of-amputees.aspx

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Future developments

Fixation

Focus

Challenges

Accessible to population with diabetes

ORIGINAL ARTICLE

Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050

Kathryn Ziegler-Graham, PhD, Ellen J. MacKenzie, PhD, Patti L. Ephraim, MPH, Thomas G. Travison, PhD, Ron Brookmeyer, PhD

Conclusions: One in 190 Americans is currently living with the loss of a limb. Unchecked, this number may double by the year 2050.

K. Ziegler-Graham, E. J. MacKenzie, P. L. Ephraim, T. G. Travison, and R. Brookmeyer, "Estimating the prevalence of limb loss in the United States: 2005 to 2050," Arch Phys Med Rehabil, vol. 89, pp. 422-9, Mar 2008.

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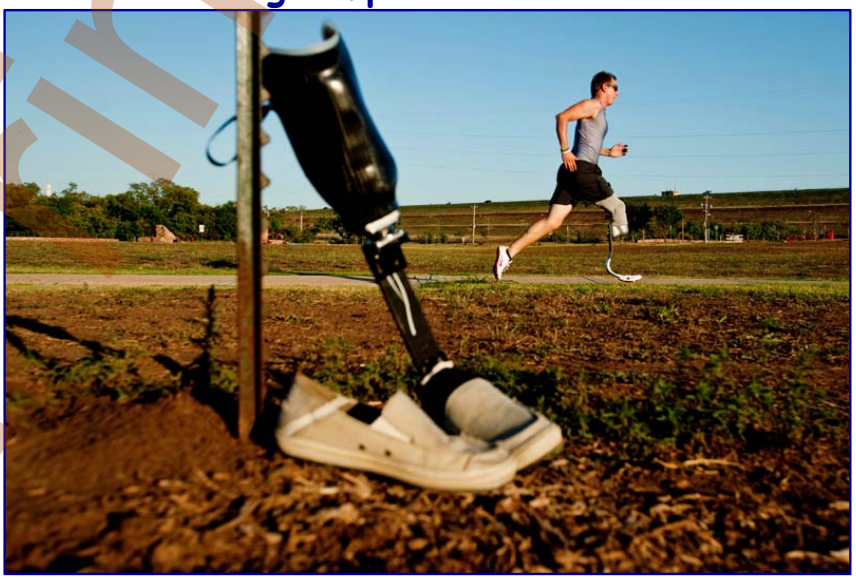
Future developments

Fixation

Focus

Challenges

High impact activities



http://www.tulsaworld.com/

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Future developments

Fixation

Focus

Challenges

Accessible to low income country

http://projecthopeinthefield.blogspot.ca/2010_04_01_archive.html

Future developments

Fixation

Focus

Challenges

Pediatric applications

http://www.dailymail.co.uk/news/article-1160954/With-pairs-legs-I-feel-10-feet-tall-The-boy-7-doesnt-let-double-amputation-hold-back.html

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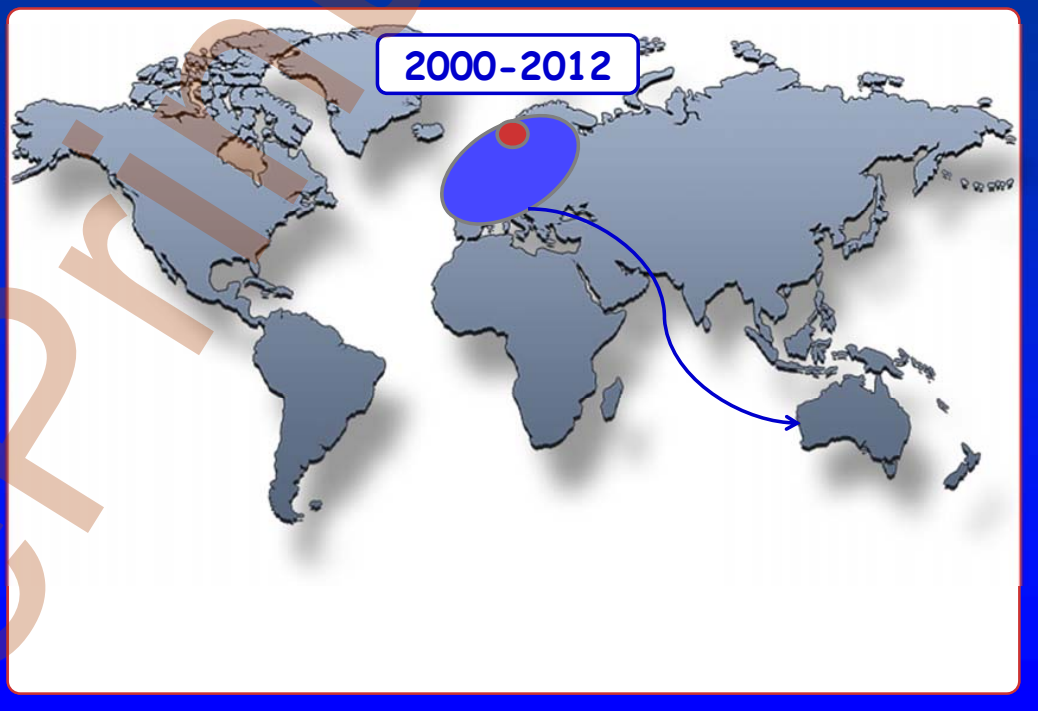
Osseointegration for limb loss: can Australia play a key role?

Centre of gravity



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Is Australia playing a role?

Yes, it is!

Clinical know-how

Is Australia playing a role?

Only country in the world!

Yes, it is!

- Several world firsts

Clinical know-how

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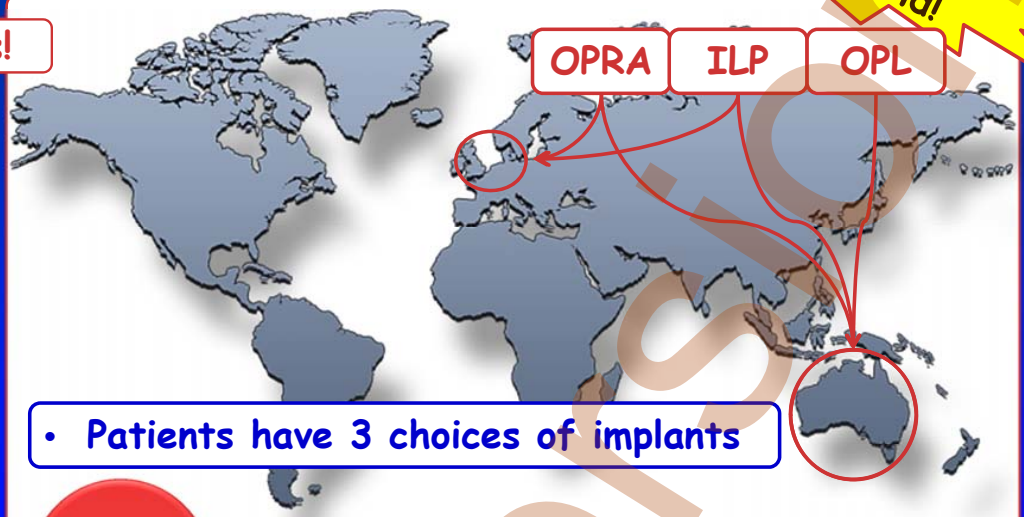
Is Australia playing a role?

Only country in the world!

Yes, it is!



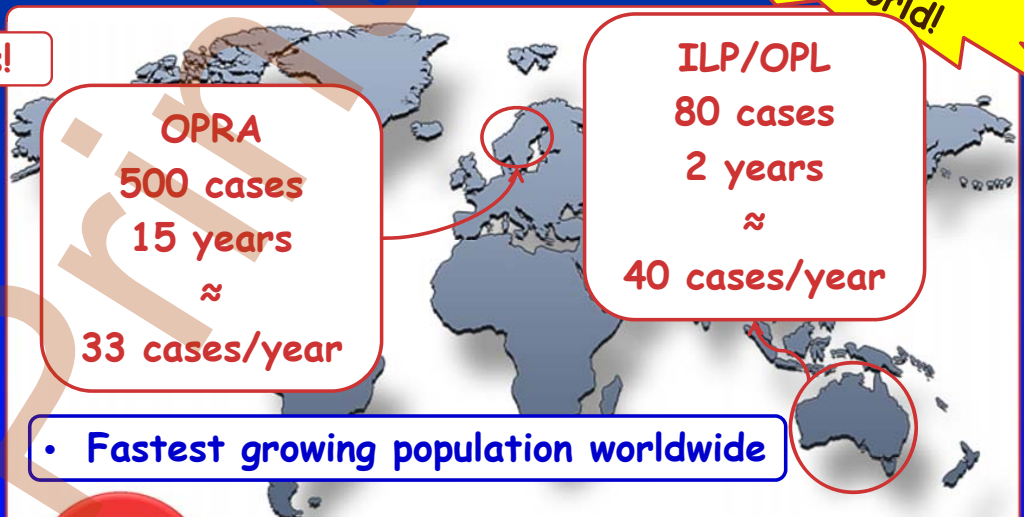
- Patients have 3 choices of implants

Clinical know-how

Is Australia playing a role?

Only country in the world!

Yes, it is!



- Fastest growing population worldwide

Clinical know-how

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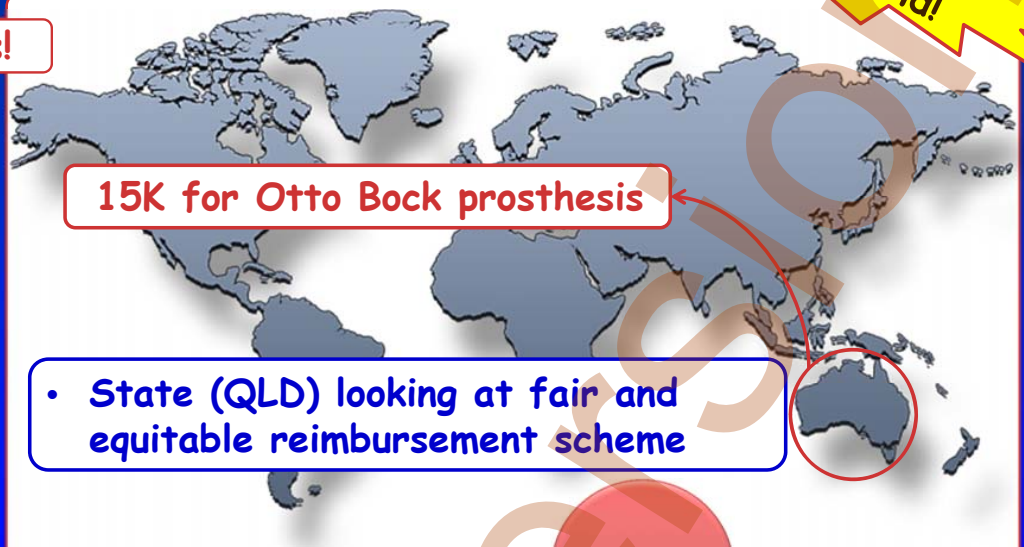
Is Australia playing a role?

Only country in the world!

Yes, it is!



15K for Otto Bock prosthesis

- State (QLD) looking at fair and equitable reimbursement scheme

Support government

Is Australia playing a role?

Only country in the world!

Yes, it is!

Unique Clinical Outcome Registry

=

Evidence-based treatment

Scientific expertise

ePrint Version

Created by Laurent Frossard (PhD)

No commercial use

Could Australia playing a bigger role?

Yes, it is!

Yes, it could

Heat + sweat
=
Poor socket fit
=
Poor quality of life

- QLD biggest demand in Australia

Clinical know-how

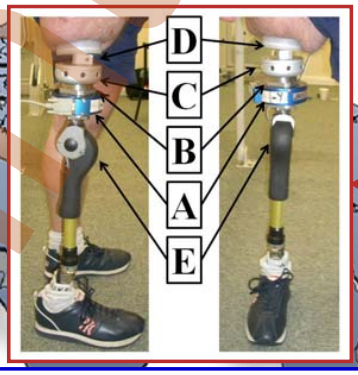
Demand Patients

Support government

Could Australia playing a bigger role?

Yes, it is

Yes, it could



- Cut-edge research on osseointegration (QUT)

Clinical know-how

Demand Patients

Support government

Scientific expertise

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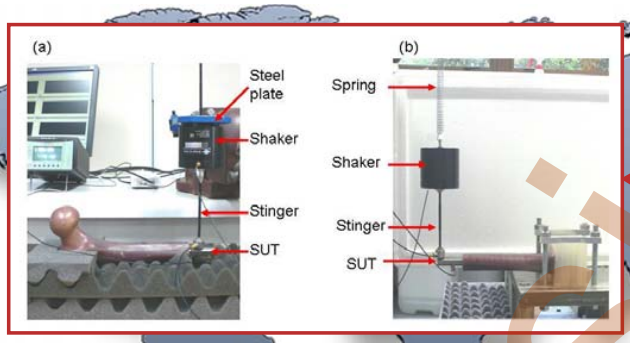
Could Australia playing a bigger role?

Yes, it is

Yes, it could



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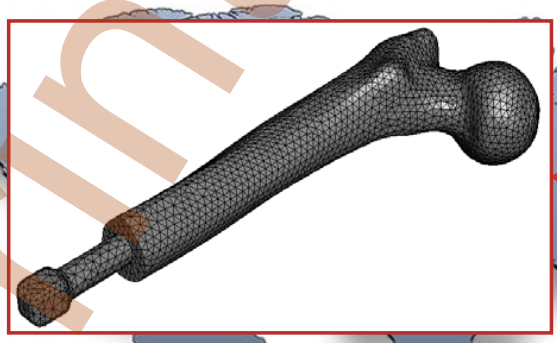

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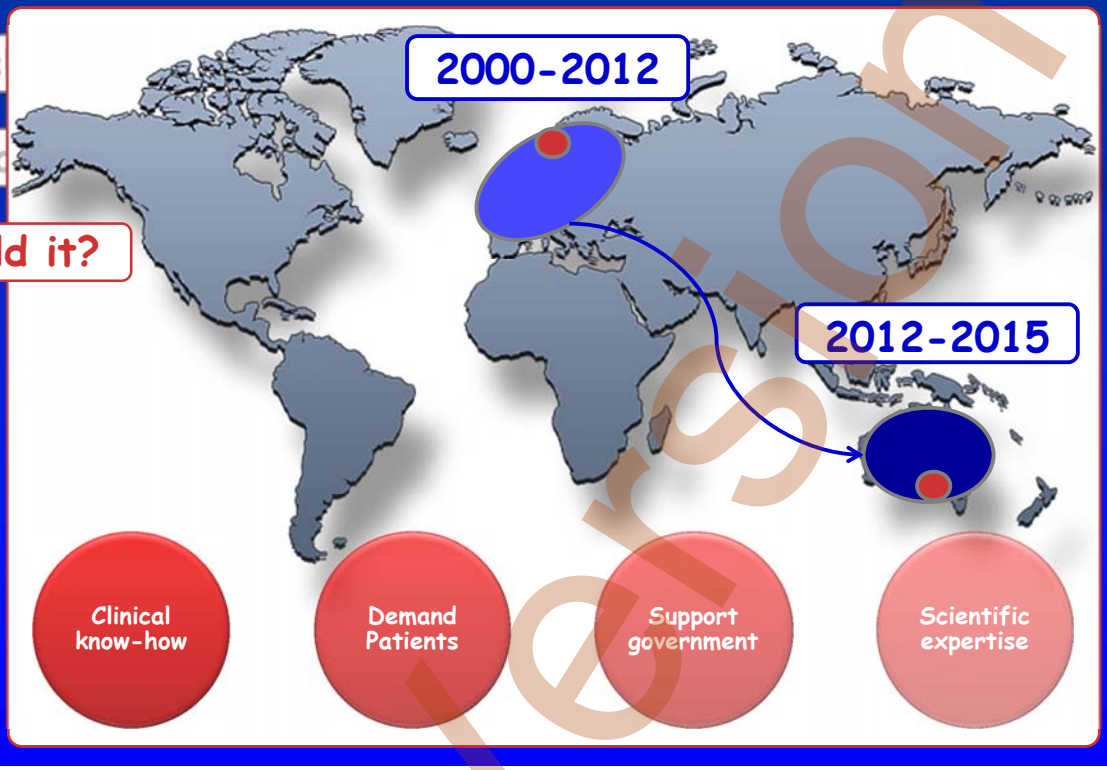
Shift in centre of gravity

Yes, it is

Yes, it co

But, would it?



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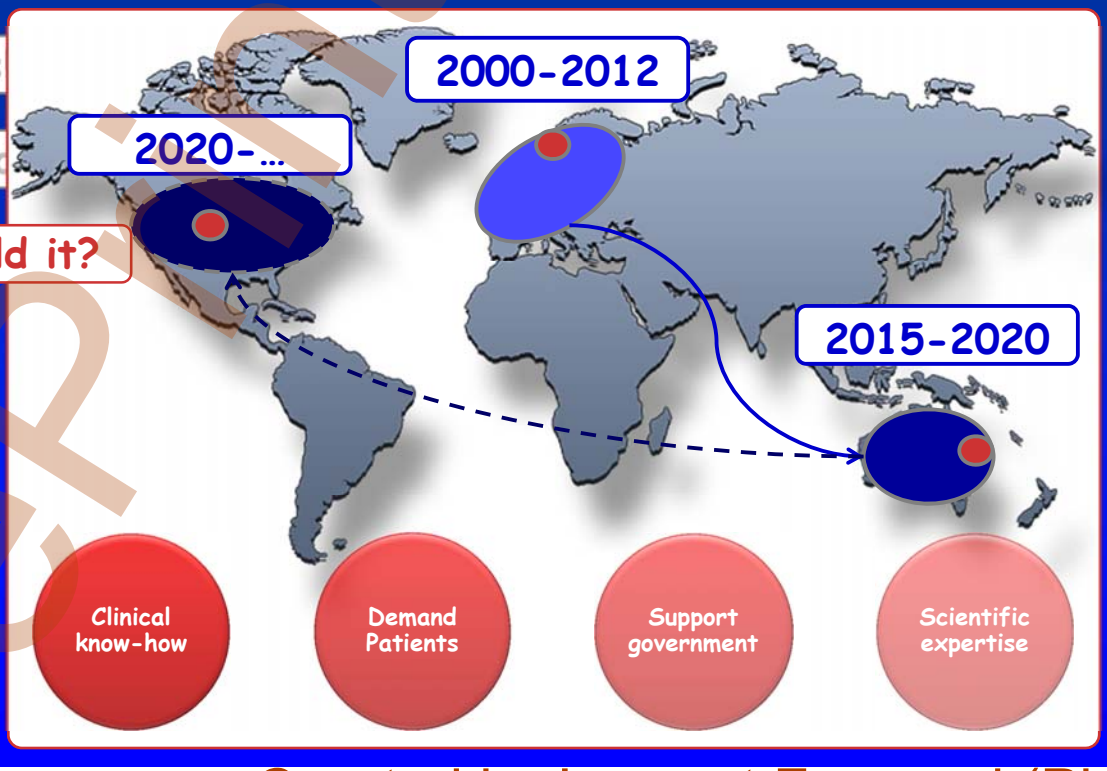

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Osseointegration for limb loss: can Australia play a key role?

Laurent Frossard

Researcher | Leader | Educator | Entrepreneur

- Adjunct professor of Biomechanics, University of the Sunshine Coast
- Adjunct professor, Queensland University of Technology
- Director / Senior Chief Scientist, YourResearProject

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